



L2 / L3 Switches

Quality of Service (QoS)

Configuration Guide

Revision 1.0

The information in this USER'S MANUAL has been carefully reviewed and is believed to be accurate. The vendor assumes no responsibility for any inaccuracies that may be contained in this document, makes no commitment to update or to keep current the information in this manual, or to notify any person organization of the updates. Please Note: For the most up-to-date version of this manual, please see our web site at www.supermicro.com.

Super Micro Computer, Inc. ("Supermicro") reserves the right to make changes to the product described in this manual at any time and without notice. This product, including software, if any, and documentation may not, in whole or in part, be copied, photocopied, reproduced, translated or reduced to any medium or machine without prior written consent.

IN NO EVENT WILL SUPERMICRO BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, SPECULATIVE OR CONSEQUENTIAL DAMAGES ARISING FROM THE USE OR INABILITY TO USE THIS PRODUCT OR DOCUMENTATION, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN PARTICULAR, SUPERMICRO SHALL NOT HAVE LIABILITY FOR ANY HARDWARE, SOFTWARE, OR DATA STORED OR USED WITH THE PRODUCT, INCLUDING THE COSTS OF REPAIRING, REPLACING, INTEGRATING, INSTALLING OR RECOVERING SUCH HARDWARE, SOFTWARE, OR DATA.

Any disputes arising between manufacturer and customer shall be governed by the laws of Santa Clara County in the State of California, USA. The State of California, County of Santa Clara shall be the exclusive venue for the resolution of any such disputes. Super Micro's total liability for all claims will not exceed the price paid for the hardware product.

FCC Statement: This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturer's instruction manual, may cause harmful interference with radiocommunications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case you will be required to correct the interference at your own expense.

California Best Management Practices Regulations for Perchlorate Materials: This Perchlorate warning applies only to products containing CR (Manganese Dioxide) Lithium coin cells. Perchlorate Material-special handling may apply. See <http://www.dtsc.ca.gov/hazardouswaste/perchlorate/> for further details.

Manual Revision 1.0

Release Date: October 23, 2013

Unless you request and receive written permission from Super Micro Computer, Inc., you may not copy any part of this document.

Information in this document is subject to change without notice. Other products and companies referred to herein are trademarks or registered trademarks of their respective companies or mark holders.

Copyright © 2013 by Super Micro Computer, Inc.

All rights reserved.

Printed in the United States of America

Contents

1	QoS Configuration Guide	4
1.1	QoS Overview.....	4
1.2	Policy-Based QoS.....	6
1.2.1	Classification and Marking	6
1.2.2	Policing.....	7
1.3	CoS-Based QoS.....	7
1.3.1	Egress Queuing.....	7
1.3.2	Scheduling.....	8
1.3.3	Default Priority.....	9
1.3.4	Bandwidth Management	10
1.4	Port-Based Rate Limit	10
1.5	HOL blocking prevention.....	10
1.6	QoS Configuration.....	10
1.6.1	Default Configuration.....	10
1.6.2	Enabling QoS	11
1.6.3	Configuring Policy-Based QoS	12
1.6.4	Configuring CoS-Based QoS	19
1.6.5	Configuring Port Rate Limit.....	24
1.6.6	Configuring HOL Blocking Prevention	25

1 QoS Configuration Guide

This document describes the system features supported in Supermicro Layer 2 / Layer 3 switches. This document describes the system features supported in Supermicro Layer 2 / Layer 3 switch products.

This document covers the system configurations for the below listed Supermicro switch products.

Top of Rack Switches

- SSE-G24-TG4
- SSE-G48-TG4
- SSE-X24S
- SSE-X3348S
- SSE-X3348T

Blade Switches

- SBM-GEM-X2C
- SBM-GEM-X2C+
- SBM-GEM-X3S+
- SBM-XEM-X10SM

The majority of this document applies to the above listed Supermicro switch products. In any particular subsection however, the contents might vary across these product models. In those sections, the differences are clearly identified with reference to a particular model(s). If any particular model is not referenced, the reader can safely assume that the content is applicable to all the above listed models.



Throughout this document, the common term “switch” refers to any of the above listed Supermicro switch models unless a particular model is noted.

1.1 QoS Overview

Typically, networks operate on a best-effort delivery basis providing all traffic equal priority and an equal chance of being delivered in a timely manner. However, during congestion, all traffic has an equal chance of being dropped. The QoS feature allows one to select specific network traffic and prioritize it according to its relative importance to provide preferential treatment. Implementing QoS makes network performance more predictable and bandwidth utilization more effective.

The QoS implementation in Supermicro switches is based on the Differentiated Services (DiffServ) architecture. DiffServ architecture specifies that each packet is classified upon entry into the

network. The classification is carried in the IP packet header using six bits from the deprecated IP type of service (ToS) field to carry the classification (class) information. Classification can also be carried in the Layer 2 frame.

- Classification bits in Layer 2 frames:

Layer 2 frame headers contain a class of service (CoS) value as a 3-bit field in the VLAN Header. Layer 2 CoS values range from 0 for low priority to 7 for high priority.

- Classification bits in Layer 3 packets:

Layer 3 IP packets can carry either an IP precedence value or a Differentiated Services Code Point (DSCP) value. QoS supports the use of either value because DSCP values are backward-compatible with IP precedence values. IP precedence values range from 0 to 7. DSCP values range from 0 to 63.

The same forwarding treatment is provided to packets with the same class information and different treatment to packets with different class information. The class information in the packet can be assigned by end hosts or by other switches or routers based on a configured policy, detailed examination of the packet, or both.

Switches and routers use the class information to limit the amount of resources allocated per traffic class. The behavior of a switch/router when handling traffic in the DiffServ architecture is called *per-hop behavior*. All devices along a network path must provide a consistent per-hop behavior in an end-to-end QoS solution.

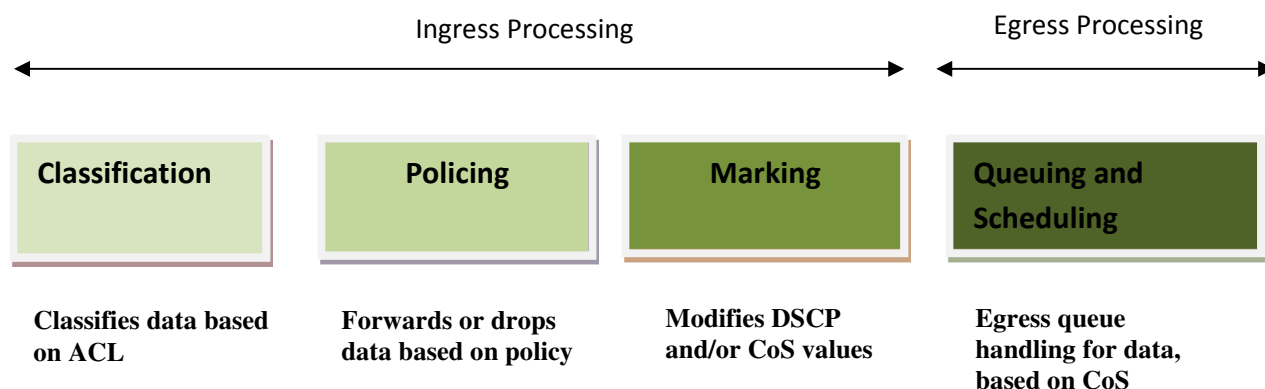


Figure QoS-1: QoS Model

The QoS Model can be divided into Ingress packet processing and Egress packet processing.

Actions at the ingress interface include classifying traffic, policing, and marking:

- Classifying distinguishes one kind of traffic from another.
- Policing determines whether a packet is in or out of profile according to the configured policer. The policer also limits the bandwidth consumed by a flow of traffic.

-
- Marking allows for the differentiation of packets by designating different identifying values, e.g. packets can be marked by setting the IP precedence bits or the IP differentiated services code point (DSCP) in the type of service (ToS) byte.

Actions at the egress interface include queuing and scheduling:

- Queuing evaluates the CoS value and determines in which of the eight egress queues to place the packet.
- Scheduling services the eight egress queues based on a configured scheduling algorithm.

1.2 Policy-Based QoS

Supernetwork switch features based on QoS Policies are:

- QoS Classification
- Marking
- Policing

1.2.1 Classification and Marking

Classification is the process of distinguishing one kind of traffic from another by examining the fields in the packet. Supernetwork switches use ACL's to specify the fields in the frame or packet based on which incoming IP traffic is classified.

Classification is enabled only if QoS is globally enabled on the switch. QoS is globally disabled by default, so no classification occurs. In Supernetwork switches, classification can be configured for all interfaces of the switch or for particular interfaces only.

After classification, the packet is sent for policing, marking, queuing and scheduling. Marking is the process of setting or modifying values in the classified traffic. In Supernetwork switches, marking can be configured using a policy map.

1.2.1.1 ClassMap and PolicyMap

IP standard, IP extended, and Layer 2 MAC access control lists (ACLs) can be used to define a group of packets with the same characteristics (class). Only the permit action of ACL's is permitted for use with QoS.



The **Deny** and **Redirect** ACL actions are not applicable for QoS.

After an ACL is associated with a class-map, it can be applied for QoS. When such a configured ACL has a match with a permit action, further classification can be done using a policy map. A policy map specifies

the actions to perform for the traffic class of a class-map. Actions can include setting a specific DSCP value or the action to take when the traffic is out of profile.

An ACL must be created for each policy and class-map. If more than one type of traffic needs to be classified, another ACL and class map can be created and associated. This relationship between the ACL, class map and policy map is depicted below.

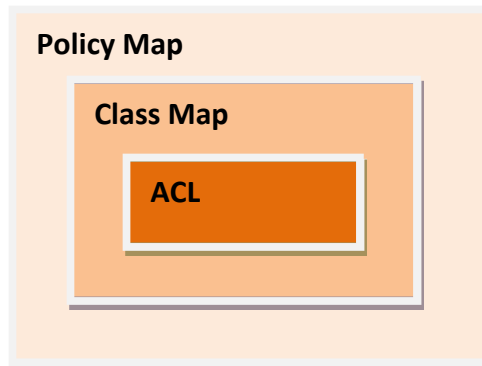


Figure QoS-2: Relationship: ACL, Policy Map & Class Map

1.2.2 Policing

Policing involves creating a policer that specifies the bandwidth limits for the traffic. Each policer specifies the action to take for packets that are in or out of profile. Packets that exceed the limits are out of profile and various actions are carried out by the marker on out of profile packets, which may include dropping the packet or marking down the packet with a new user-defined value.

1.3 CoS-Based QoS

Supernetwork switch features based on Class of Service (CoS) are:

- Queuing
- Scheduling
- Bandwidth Management
- Default Priority

1.3.1 Egress Queuing

The CoS priority of a packet is mapped to a traffic class. Supernetwork switches provide support to configure the mapping of CoS priority to a traffic class. Each traffic class is mapped to eight egress queues in the switch.

The traffic class is taken from the CoS value of the ingress packet. If an ingress packet does not have a CoS (untagged packets), the port default priority will be used.

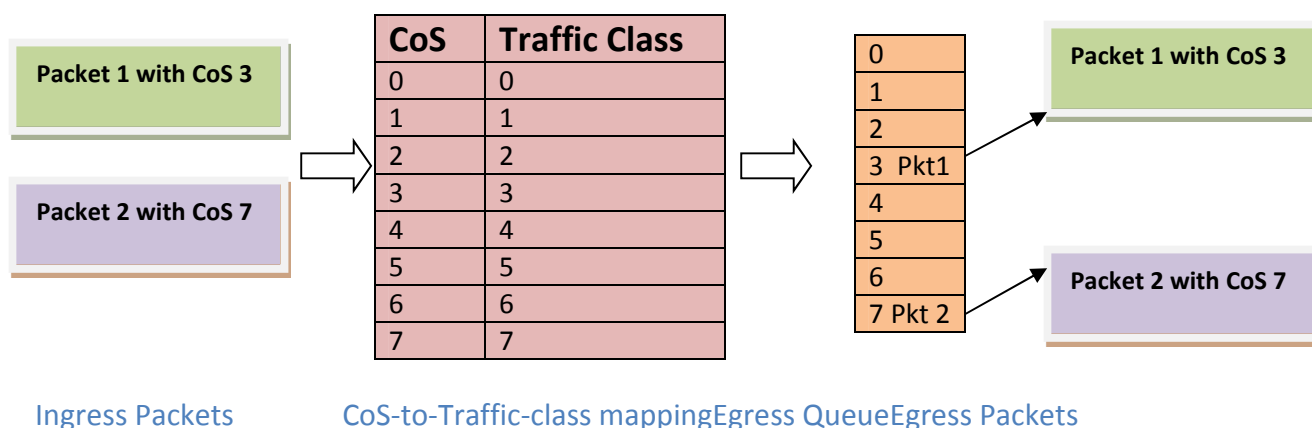


Figure QoS-3: Egress Queuing

The above figure shows the egress queuing procedure. When a tagged packet with CoS value 3(packet1) arrives in the switch, the CoS to egress queue mapping for the particular destination port is looked up. Based on CoS to egress queue mapping, packets with CoS value 3 are queued in Queue-3 and transmitted. Similarly, when a tagged packet with CoS value 7(packet2) arrives in switch, the CoS to egress queue mapping for the particular destination port is looked up. Based on CoS to egress queue mapping, packets with CoS value 7 are queued in Queue-7 and transmitted.

1.3.2 Scheduling

Supernetwork switches support eight CoS queues for each egress port. For each of the eight queues, various types of scheduling can be configured:

Strict Priority

Strict priority scheduling is based on the priority of queues. Packets in a high-priority queue are always sent first and packets in a low-priority queue are not sent until all the high-priority queues are empty.

Round Robin(RR)

Using the round-robin (RR) scheduling algorithm, packets in queues are transmitted in a FIFO manner, i.e. one packet after the other. All queues have the same priority and weight in an RR configuration.

Weighted RoundRobin (WRR)

In WRR scheduling, the user specifies a number to indicate the importance (weight) of the queue relative to the other CoS queues. WRR scheduling prevents low-priority queues from being completely neglected during periods of high-priority traffic. The WRR scheduler sends some packets from each queue in turn. The number of packets it sends corresponds to the relative importance of the queue. By using WRR, low-priority queues can send packets even when high-priority queues are not empty.

Deficit WRR

Bandwidth allocation can be unfair when the average packet sizes are different between the queues and their flows. This behavior can result in service degradation for queues with smaller average packet sizes. Deficit Weighted Round Robin (DWRR) is a modified weighted round-robin scheduling that can handle packets of variable size.

1.3.3 Default Priority

The Class of Service (CoS) priority field is taken from the VLAN header of a received packet. If the received packet does not have a VLAN header, the default port priority is used as the CoS value. Supermicro switches provide an option to configure the default priority.

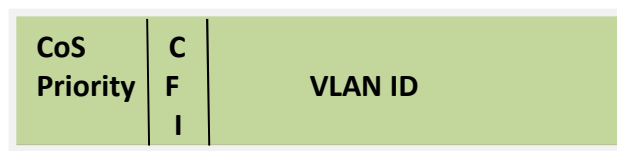


Figure QoS-4: VLAN Tag and CoS Priority

In the above figures, CoS priority is a 3-bit field in a tagged frame that indicates the frame priority level, ranging from 0 (best effort) to 7 (highest) with 1 representing the lowest priority. These values can be used to prioritize different classes of traffic (voice, video, data, etc.).

For IEEE 802.1Q frames with tag information, the priority value from the header frame is used. For native frames, the default priority of the input port is used. Supermicro switches allow users to configure the default port priority.

Each ingress port on the switch has a single receive queue buffer for incoming traffic. When an untagged frame arrives, it is assigned the value of the port as its port default priority. Tagged frames use the assigned CoS value when it passes through the ingress port.

1.3.4 Bandwidth Management

Bandwidth limiting is configured at the level of traffic classes. Traffic classes can be assigned minimum bandwidths, maximum bandwidths, and weights. Weights are used to divide the bandwidth proportionally among all traffic classes within a QoS policy, in such a way that a traffic class does not receive more than its maximum bandwidth or less than its minimum bandwidth.

1.4 Port-Based Rate Limit

Rate limits define which packets conform to or exceed the defined rate based on the following two parameters:

Average rate determines the average transmission rate. Traffic that falls under this rate will always conform.

Burst size specifies in bits (or bytes) per burst how much traffic can be sent within a given unit of time without causing scheduling concerns. It determines how large a traffic burst can be before it exceeds the rate limit.

Traffic that exceeds the rate limit is dropped. Supermicro switches support output rate limits.

1.5 HOL Blocking Prevention

Supermicro switches provide eight egress queues per port. Each queue has a dynamic packet limit based on the availability of packet buffer memory. When a switch receives packets at a fast rate destined to a particular egress port, its egress port queues become filled up. When the egress queue is full, all packets at ingress are dropped. This phenomenon of dropping ingress packets due to egress port/CoS queue over-subscription is called Head of Line (HOL) blocking.

Supermicro switches provide support to prevent HOL blocking. When HOL blocking prevention is enabled in the switch, it drops packets newly arriving on the ingress if they are destined to an oversubscribed egress port, based on the egress queue threshold. The switch stops dropping ingress packets once it determines the egress queue is not over-subscribed by using specific counters and thresholds. This mechanism ensures fair access to all port buffers.

HOL blocking prevention provides lossy buffer management, however it improves overall system throughput.

1.6 QoS Configuration

1.6.1 Default Configuration

Parameter	Default Value
QoS Status	Disabled
Class Map	None
Policy Map	None
Default Priority	0
Minimum Bandwidth	0
Maximum Bandwidth	0
Weight	1
Scheduling Algorithm	Strict Queuing
Rate Limit	0
Burst Size	0
HOL	Enabled

The default priority to traffic classqueue mapping:

Priority	Traffic Class queue
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7

1.6.2 EnablingQoS

QoS is disabled by default in Supermicro switches. Follow the below steps to enable QoS.

Step	Command	Description
Step 1	configure terminal	Enters the configuration mode
Step 2	set qos enable	Enables QoS on all interfaces
Step 3	End	Exits the configuration mode



The “**set qos disable**” command disables QoS in the switch.

QoS must be enabled before configuring any of the QoS features.

The example below shows the commands used to enable QoS.

```
SMIS# configure terminal
SMIS(config)# set qos enable
SMIS(config)# end
```

```
SMIS(config)# show running-config
```

```
Building configuration...
Switch ID   Hardware Version   Firmware Version
0          SBM-GEM-X3S+ (B4-01)    1.0.14-3
```

```
vlan 1
portsgi 0/1-24 untagged
ports ex 0/1-3 untagged
exit
```

```
setqos enable
```

1.6.3 Configuring Policy-Based QoS

Follow the steps below to configure Policy-Based QoS features such as classification, marking and policing.

Step	Command	Description
Step 1	configure terminal	Enters the configuration mode
Step 2	Create MAC Extended or IP Standard or IP Extended ACL. If required, apply ACL to specific Interface(s).	Refer to the ACL Configuration Guide at www.supermicro.com/products/nfo/networking.cfm .
Step 3	class-map <class-map-number(1-65535)>	Creates a class map and enters the class-map configuration mode. <i>class-map-number</i> - QoS class map number in range from 1-65535.
Step 4	match access-group { mac-access-list ip-access-list } { <acl-index-num (1-65535) > <acl-name> }	This command specifies the fields in the incoming packets that are to be examined to classify the packets. The IP access group / MAC access group can be used as match criteria. mac-access-list - Accesses list created based on MAC addresses for non-IP traffic ip-access-list - Accesses list created based on IP addresses. The IP-access list can either be defined as a standard IP-access list or an extended IP-access list.

		<p>acl-index-num - Specifies the ACL index range. The ACL index range for an IP standard ACL is 1 to 1000 and 1001 to 65535 for an IP extended ACL. The ACL index range for a MAC extended ACL is 1 to 65535.</p> <p>ACL-name – Specifies the configured ACL name as a string not exceeding 32 characters</p>
Step 5	Exit	Exits the class map configuration mode.
Step 6	policy-map <policy-map-number(1-65535)>	Creates a policy map and enters the policy-map configuration mode.
		policy-map-number - QoS policy map number
Step 7	class <class-map-number(1-65535)>	<p>This command defines a traffic classification for the policy to act upon. The class-map-number that is specified in the policy map ties the characteristics for that class to the class map and its match criteria as configured with the class-map global configuration command. Upon execution of the class command, the switch enters the policy-map class configuration mode.</p> <p><i>class-map-number</i> – The class map number to associate the policy, in range of 1-65535</p>
Step 8	set {cos<new-cos(0-7)> ip dscp<new-dscp(0-63)> ip precedence <new-precedence(0-7)>}	<p>(Optional) Configures the in-profile action by setting a class of service (CoS), differentiated services code point (DSCP), or IP-precedence value in the packet.</p> <p><i>cos</i> - New COS value assigned to the classified traffic, in range of 0-7</p> <p><i>ip dscp</i> - New DSCP value assigned to the classified traffic, in range of 0-63</p> <p><i>ip precedence</i> - New IP-precedence value assigned to the classified traffic, in range of 0-7</p>
Step 9	police <rate-Kbps(64-1048572)> exceed-action {drop policed-dscp-transmit <new-dscp(0-63)>}	<p>(Optional) Configures a policer for the classified traffic. This command also specifies the action to be taken if the specified rate is exceeded or if there is no match for the policy configured.</p> <p>rate-kbps- Average traffic rate in kilobits per second (Kbps), in range 64-1048572</p> <p>exceed-action - Indicates the action of the switch when the specified rate is exceeded.</p>

		drop - drops the packet
		policed-dscp-transmit - changes the differentiated services code point (DSCP) of the packet to that specified in the policed-DSCP map and then sends the packet. The DSCP range is 0-63.
Step 10	End	Exits the configuration mode.
Step 11	show class-map [<class-map-num(1-65535)>]	Displays the classmap configuration.
	show policy-map [<policy-map-num(1-65535)> [class <class-map-num(1-65535)>]	Displays the policy map configuration.



ACL cannot be modified unless it is removed from the class-map.

For modifying an ACL associated with a classmap, follow the steps below:

- 1) Remove policy map
- 2) Remove classmap
- 3) Modify the ACL
- 4) Re-create the classmap
- 5) Re-create the policy map

If required, an ACL's association with an interface must be configured before the "**class-map**" configuration, i.e. after associating the ACL with a classmap using the "**match**" command, the ACL cannot be associated with an interface.

These commands either delete the particular configuration or reset it to its default value.

```
no class-map <class-map-number(1-65535)>
no policy-map <policy-map-number(1-65535)>
no class <class-map-number(1-65535)>
```

Before deleting a classmap, any policy map associated with it must first be deleted.

The example below shows the commands used to configure QoS classification, marking and policing.

Example 1: Classification and Marking

Create a Layer 2 MAC ACL with two permit statements and attach it to an ingress interface. The first permit statement allows traffic from the host with a MAC address of 00:30:48:14:c8:29 to be sent to any host.

```
SMIS# configure terminal
SMIS(config)# mac access-list extended mac1
SMIS(config-ext-macl)# permit host 00:30:48:14:c8:29 any
SMIS(config-ext-macl)# exit
```

```
SMIS(config)# set qos enable
```

```
SMIS(config)# interface Gi 0/3
SMIS(config-if)# mac access-group mac1 in
SMIS(config-if)# exit
```

```
SMIS(config)# class-map 5
SMIS(config-cmap)# match access-group mac-access-list mac1
SMIS(config-cmap)# exit
```

```
SMIS(config)# policy-map 5
SMIS(config-pmap)# class 5
```

Existing Policymap configurations have been deleted. Please apply the policymap to make it active.

```
SMIS(config-pmap-c)# set cos 6
SMIS(config-pmap-c)# end
```

```
SMIS(config)# mac access-list extended mac2
SMIS(config-ext-macl)# permit host 00:b0:d0:86:bb:f7 any
SMIS(config-ext-macl)# exit
```

```
SMIS(config)# interface Gi 0/3
SMIS(config-if)# mac access-group mac2 in
SMIS(config-if)# exit
```

```
SMIS(config)# class-map 10
SMIS(config-cmap)# match access-group mac-access-list mac2
SMIS(config-cmap)# exit
```

```
SMIS(config)# policy-map 10
SMIS(config-pmap)# class 10
```

Existing policymap configurations have been deleted. Please apply the policymap to make it active.

```
SMIS(config-pmap-c)# set cos 7
SMIS(config-pmap-c)# end
```

```
SMIS# show policy-map
```

DiffServ Configurations:

Quality of Service has been enabled

Policy Map 5 is active

Class Map: 5

In Profile Entry

In profile action : policed-cos6

Policy Map 10 is active

Class Map: 10

In Profile Entry

In profile action : policed-cos7

SMIS# **show class-map**

DiffServ Configurations:

Class map 5

Filter ID : mac1

Filter Type : MAC-FILTER

DiffServ Configurations:

Class map 10

Filter ID : mac2

Filter Type : MAC-FILTER

SMIS# **show running-config**

Building configuration...

Switch ID	Hardware Version	Firmware Version
-----------	------------------	------------------

0	SBM-GEM-X3S+ (B4-01)	1.0.14-3
---	----------------------	----------

vlan 1

```
portsgi 0/1-24 untagged
ports ex 0/1-3 untagged
exit

mac access-list extended mac1
permit host 00:30:48:14:c8:29 any
exit
mac access-list extended mac2
permit host 00:b0:d0:86:bb:f7 any
exit

interfaceGi 0/3
mac access-group mac1 in
mac access-group mac2 in

exit
setqos enable
class-map 5
match access-group mac-access-list mac1
exit
class-map 10
match access-group mac-access-list mac2
exit
policy-map 5
class 5
setcos 6
exit
exit
policy-map 10
class 10
setcos 7
exit
exit
```

Example 2: Policing

Create a policy map for the switch without attaching it to an ingress interface. In the configuration, the IP standard ACL permits traffic from network 20.1.0.0. For traffic matching this classification, the DSCP value in the incoming packet is trusted. If the matched traffic exceeds an average traffic rate of 4800 bps, its DSCP is marked down to a value of 10 and transmitted.

```
SMIS# configure terminal
SMIS(config)# ip access-list standard 1
SMIS(config-std-nacl)# permit 20.1.0.0 255.255.0.0 any
SMIS(config-std-nacl)# exit
```

```
SMIS(config)# set qos enable
```

```
SMIS(config)# class-map 1
SMIS(config-cmap)# match access-group ip-access-list 1
SMIS(config-cmap)# exit
```

```
SMIS(config)# policy-map 1
SMIS(config-pmap)# class 1
```

Existing policymap configurations have been deleted. Please apply the policymap to make it active.

```
SMIS(config-pmap-c)# police 500000 exceed-action policed-dscp-transmit 10
SMIS(config-pmap-c)# end
```

```
SMIS# show policy-map
```

DiffServ Configurations:

Quality of Service has been enabled

Policy Map 1 is active

Class Map: 1

Out Profile Entry

Metering on

burst bytes/token size : 6

Refresh count : 500000

Out profile action : policed-dscp 10

```
SMIS# show class-map
```

DiffServ Configurations:

Class map 1

Filter ID : 1

Filter Type : IP-FILTER

```
SMIS# show running-config
```

Building configuration...

Switch ID	Hardware Version	Firmware Version
-----------	------------------	------------------

0 SBM-GEM-X3S+ (B4-01) 1.0.14-3

vlan 1

portsgi 0/1-24 untagged

ports ex 0/1-3 untagged

exit

ip access-list standard 1

permit 20.1.0.0 255.255.0.0 any

exit

setqos enable

class-map 1

match access-group ip-access-list 1

exit

policy-map 1

class 1

police 500000 exceed-action policed-dscp-transmit 10

exit

exit

1.6.4 Configuring CoS-Based QoS

Follow the steps below to configure CoS-Based features such as default priority, scheduling and bandwidth.

Step	Command	Description
Step 1	configure terminal	Enters the configuration mode
Step 2	vlan map-priority <priority value(0-7)> traffic-class <Traffic class value(0-7)>	Maps a priority to a traffic class in the switch. The frame received with the configured priority will be processed in the configured traffic class. Priority- Priority of the packet, in range of 0-7. Class –Traffic class in range of 0-7.
Step 3	interface <interface-type><interface-id> or interface range <interface-type><interface-id>	(Optional) Enters the interface configuration mode. <i>interface-type</i> – may be any of the following: gigabit-ethernet – gi extreme-ethernet – ex qx-ethernet – qx

		<p><i>interface-id</i> is in <i>slot/port</i> format for all physical interfaces.</p> <p>To configure multiple interfaces, use the “interface range ...” command. To provide a range use a hyphen (-) between the start and end interface numbers. E.g.: int range gi 0/1-10</p> <p>To provide multiple interfaces or ranges, separate with a comma (,). E.g.: int range gi 0/1-10, gi 0/20</p> <p>If multiple interfaces are provided, the next step will perform the particular configuration on all these interfaces.</p>
Step 4	switchport priority default <priority value(0-7)>	(Optional) Configures the default priority for the interface in range of 0-7.
Step 5	cosq scheduling algorithm { strict rr wrr deficit }	<p>(Optional) Configures the QoS Egress queue scheduling algorithm.</p> <p>strict - strict</p> <p>rr - round robin</p> <p>wrr - weighted round robin (WRR)</p> <p>deficit – deficit WRR</p>
Step 6	traffic-class <integer(0-7)> weight <integer(0-15)> [minbandwidth<integer(64-16777152)>] [maxbandwidth<integer(64-16777152)>]	<p>(Optional) Configures the egress queue minimum and maximum bandwidth.</p> <p>weight - Configures the queue weights in range of 0-15</p> <p>minbandwidth - Configures the minimum bandwidth for the queue in range of 64-16777152</p> <p>maxbandwidth - Configures the maximum bandwidth for the queue in range of 64-16777152</p>
Step 7	End	Exits the configuration mode.
Step 8	show vlan port config port [<interface-type><interface-id>] show vlan traffic-classes	<p>Displays the port default priority configuration.</p> <p>Display the traffic class and egress queue mapping.</p>



The “**no cosq scheduling algorithm**” resets the CoS queue scheduling algorithm configuration to its default value of *strict*.

The “**no traffic-class [<integer(0-7)>] [weight] [minbandwidth] [maxbandwidth]**” command resets the minimum/maximum bandwidth configuration to its default value of 0 and weight to 1.

The “**no switchport priority default**” command resets the default priority configuration to its default value of 0.

The “**no vlan map-priority <priority value (0-7)>**” command resets the egress CoS queue mapping to its default value.

The example below shows the commands used to configure QoS default priority, scheduling and bandwidth.

Example 1: Default Priority

```
SMIS# configure terminal
SMIS(config)# interface Gi 0/10
SMIS(config-if)# switchport priority default 5
SMIS(config-if)# end
```

SMIS# **show vlan port config port Gi 0/10**

Vlan Port configuration table

```
-----
Port Gi0/10
Port Vlan ID          : 1
Port Access Vlan ID   : 1
Port Acceptable Frame Type : Admit All
Port Ingress Filtering : Disabled
Port Mode             : Hybrid
Port Gvrp Status      : Disabled
Port Gmrp Status      : Disabled
Port Gvrp Failed Registrations : 0
Gvrp last pdu origin  : 00:00:00:00:00:00
Port Restricted Vlan Registration : Disabled
Port Restricted Group Registration : Disabled
Mac Based Support     : Disabled
Port-and-Protocol Based Support : Enabled
Default Priority       : 5
Filtering Utility Criteria : Default
Allowed Vlans on Trunk : 1-4069
Trunk Native Vlan Id  : 0
```

Example 2: Scheduling

The example below shows the commands used to configure the QoS scheduling algorithm.

```
SMIS# configure terminal
SMIS(config)# set qos enable
SMIS(config)# interface Gi 0/8
SMIS(config-if)# cosq scheduling algorithm wrr
SMIS(config-if)# end
```

SMIS# **show cosq algorithm**

CoSq Algorithm

```
-----
Interface   Algorithm
-----
Gi0/1       StrictPriority
Gi0/2       StrictPriority
Gi0/3       StrictPriority
Gi0/4       StrictPriority
Gi0/5       StrictPriority
Gi0/6       StrictPriority
Gi0/7       StrictPriority
Gi0/8       WeightedRoundRobin
Gi0/9       StrictPriority
Gi0/10      StrictPriority
Gi0/11      StrictPriority
Gi0/12      StrictPriority
Gi0/13      StrictPriority
Gi0/14      StrictPriority
Gi0/15      StrictPriority
Gi0/16      StrictPriority
Gi0/17      StrictPriority
Gi0/18      StrictPriority
Gi0/19      StrictPriority
Gi0/20      StrictPriority
Gi0/21      StrictPriority
Gi0/22      StrictPriority
Gi0/23      StrictPriority
Gi0/24      StrictPriority
Ex0/1       StrictPriority
Ex0/2       StrictPriority
Ex0/3       StrictPriority
Ex0/3       StrictPriority
```

Example 3: Egress Bandwidth

```
SMIS# configure terminal
SMIS(config)# set qos enable
SMIS(config)# interface Gi 0/15
SMIS(config-if)# traffic-class 6 weight 7 minbandwidth 6400 maxbandwidth 6400000
SMIS(config-if)# end
```

```
SMIS# show cosq weights-bw interface Gi 0/15
```

CoSq Weights and Bandwidths

```
-----
Interface CoSqdCoSqWeightMinBwMaxBw
-----
Gi0/15    0    1    0    0
Gi0/15    1    1    0    0
Gi0/15    2    1    0    0
Gi0/15    3    1    0    0
Gi0/15    4    1    0    0
Gi0/15    5    1    0    0
Gi0/15    6    7   6400 6400000
Gi0/15    7    1    0    0
```

Example 4: Egress Queue

```
SMIS# configure terminal
SMIS(config)# vlan map-priority 2 traffic-class 7
SMIS(config)# end
SMIS# show vlan traffic-classes
```

Priority to Traffic Class Queue Mapping

```
-----
Priority      Traffic Class Queue
-----
0            0
1            1
2            7
3            3
4            4
5            5
6            6
7            7
```

1.6.5 Configuring Port Rate Limit

Rate limit is disabled by default in Supermicro switches. Follow the below steps to enable the port rate limit.

Step	Command	Description
Step 1	configure terminal	Enters the configuration mode
Step 2	interface <interface-type><interface-id> or interface range <interface-type><interface-id>	(Optional) Enters the interface configuration mode. <i>interface-type</i> – may be any of the following: gigabit-ethernet – gi extreme-ethernet – ex qx-ethernet – qx <i>interface-id</i> is in <i>slot/port</i> format for all physical interfaces. To configure multiple interfaces, use the “ interface range ... ” command. To provide a range, use a hyphen (-) between the start and end interface numbers. E.g.: int range gi 0/1-10 To provide multiple interfaces or ranges, separate with a comma (,). E.g.: int range gi 0/1-10, gi 0/20 If multiple interfaces are provided, the next step will perform the particular configuration on all these interfaces.
Step 3	rate-limit output <rate-value-kbps (1-10000000)><burst-value-kbits (1-10000000)>	Enables the egress rate limit for the interface(s), set to the closest rate (kbps) and burst size (kbits) as the hardware capabilities. Rate limiting is applied to packets sent out on a particular interface. Rate limit and burst size in range of 1-10000000.
Step 4	End	Exits the configuration mode.
Step 5	show interface [{ [<interface-type><interface-id>] rate-limit	Displays the rate limit configuration on an interface



The “**no rate-limit output**” command disables the rate limit on a particular interface.

The example below shows the commands used to configure the rate limit.

```
SMIS# configure terminal
SMIS(config)# interface Gi 0/20
SMIS(config-if)# rate-limit output 500000 4800
SMIS(config-if)# end
```

```
SMIS# show interface Gi 0/20 rate-limit
```

```
Gi0/20
Rate Limit   : 500000 Kbps
Burst Size   : 4800 Kbps
```

1.6.6 Configuring HOL Blocking Prevention

HOL is enabled by default in Supermicro switches. Follow the steps below to disable HOL blocking.

Step	Command	Description
Step 1	configure terminal	Enters the configuration mode
Step 2	no hol blocking prevention	Disables HOL blocking
Step 3	End	Exits the configuration mode.
Step 4	show interfaces [{ [<interface-type><interface-id>]	Displays the interface configuration.



The “**hol blocking prevention**” command enables HOL blocking.

The example below shows the commands used to disable HOL blocking.

```
SMIS# configure terminal
SMIS(config)# interface Gi 0/4
SMIS(config-if)# no hol blocking prevention
SMIS(config-if)# end
```

```
SMIS# show interface Gi 0/4
```

```
Gi0/4 up, line protocol is down (not connect)
```

Bridge Port Type: Customer Bridge Port

Hardware Address is 00:30:48:e3:04:78

MTU 1500 bytes, Full duplex, 1 Gbps, Auto-Negotiation

HOL Block Prevention disabled.

Input flow-control is off, output flow-control is off

Link Up/Down Trap is enabled

Reception Counters

Octets	: 0
Unicast Packets	: 0
Broadcast Packets	: 0
Multicast Packets	: 0
Pause Frames	: 0
Undersize Frames	: 0
Oversize Frames	: 0
CRC Error Frames	: 0
Discarded Packets	: 0
Error Packets	: 0
Unknown Protocol	: 0

Transmission Counters

Octets	: 0
Unicast Packets	: 0
Non-Unicast Packets	: 0
Pause Frames	: 0
Discarded Packets	: 0
Error Packets	: 0